

WHAT IS CLAIMED IS:

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1. A liquid container detachably mountable on a vertically upward aperture, which comprises having a flat shape and being provided on the bottom thereof with independent two fluid connection ports for communicating a liquid chamber with the exterior of the container, wherein said two connection ports are provided close to an end portion of the bottom.
  2. A liquid container according to claim 1, wherein the external shape and the internal space of the liquid container are pointed toward the bottom thereof.
  3. A liquid container according to claim 1, wherein the two fluid connection ports are positioned on a line passing through the approximate center of the shorter side of the flat shape of the liquid container.
  4. A liquid container according to claim 1, wherein a fluid connection port closer to the end of the bottom of the liquid container is used for enabling derivation of the liquid of the liquid chamber.
  5. A liquid container according to claim 4,

wherein a member for filtering the derived liquid is so provided as to cover the aperture of said fluid connection port close to the end portion of said liquid chamber.

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6. A liquid container according to claim 1, wherein a fluid connection port closer to the center of the bottom of the liquid container among the fluid connection ports positioned in the end portion of the liquid container bottom is used for enabling air introduction.

7. A liquid container according to any of claims 1 to 6, wherein a tubular member protrudes in said liquid chamber toward the ceiling thereof, so as to surround the periphery of the aperture of said fluid connection port closer to the center, except for the direction toward the ceiling.

8. A liquid container according to claim 1, comprising a structure for perturbing the rising motion of bubbles in an upper space where air bubbles rise from the internal bottom of the tubular member along with the liquid derivation in a state where said liquid container is connected with a recording apparatus.

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9. A liquid container according to claim 8,  
wherein said structure is a rib connecting two faces  
of largest area mutually opposed in said liquid  
container of flat shape.

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10. A liquid container according to claim 8,  
containing recording liquid which contains pigment.

11. A liquid container according to claim 1,  
10 wherein the two fluid connection ports are provided  
with elastic members for sealing the liquid chamber.

12. A liquid container according to claim 1,  
comprising an identification information structure  
15 for mechanically holding identification information  
of the liquid container, so as to substantially  
perpendicularly protruding from a face continuous to  
and crossing the longitudinal end of the oblong  
bottom of the liquid container.

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13. A liquid container according to claim 1,  
wherein an area in the container bottom not provided  
with the fluid connection ports includes an  
information memory element capable of holding the  
25 identification information of the liquid container  
and composed of an electric, magnetic, optical or  
combined system.

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14. A liquid container according to claim 13,  
wherein said information memory element is capable,  
in addition to the readout of the memorized  
information from the exterior of the liquid container,  
5 of alteration, deletion or additional writing of the  
memorized information.

15. A liquid supply system utilizing the liquid  
container according to any of claims 1 to 6, 8 to 14,  
10 wherein an air introducing connection needle and a  
liquid deriving connection needle are respectively  
connected to the two connection ports in the bottom  
of the liquid container.

15 16. A liquid supply system utilizing the liquid  
container according to any of claims 1 to 6, 8 to 14,  
comprising:

an air introducing connection needle and a liquid  
deriving connection needle to be respectively  
20 connected to the two connection ports in the bottom  
of the liquid container;

wherein said air introducing connection needle is  
so positioned as to remain within said tubular member  
and the height of said liquid deriving connection  
25 needle is approximately same as that of said air  
introducing connection needle.

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17. A liquid supply system according to claim 16,  
wherein said liquid supply system is to supply a  
liquid discharge head with liquid, and said liquid  
discharge head is an ink jet head for pushing out the  
5 liquid in a nozzle by thermal or vibration energy  
thereby causing a liquid droplet to fly.

18. An ink jet recording apparatus capable  
detachably mounting the liquid container according to  
10 any of claims 1 to 6, 8 to 14.

19. A mounting method for a liquid container  
according to any of claims 1 to 6, 8 to 13, and  
detachably mountable on an ink jet recording  
15 apparatus in which a connection member with said  
liquid container extends in a direction opposed to  
the mounting direction of said liquid container, the  
method comprising:

a step of guiding the liquid container  
20 principally utilizing the external shape portion in  
the projection plane in the inserting direction until  
the front end portion of a connection member of the  
recording apparatus enters a connection member  
introduction guide portion provided at the entrance  
25 of the fluid connection port of the bottom of the  
liquid container;

a step of relaxing the positional defining by

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said external shape portion after the front end portion of the connection member enters the guide portion of the fluid connection port in the bottom of the liquid container;

- 5       a succeeding step of executing entry of the connection member into the fluid connection port; and  
      a succeeding step of starting the connection of a connector corresponding to an information memory element with the information memory element.

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20. A liquid container comprising:

a liquid chamber containing liquid;

- a liquid supply portion provided in the bottom portion of said liquid chamber for supplying the  
15 liquid in said liquid chamber to the exterior;

- an air introducing portion provided in the bottom portion of said liquid chamber and adapted to introduce air into said liquid chamber so as to maintain a constant pressure in said liquid chamber  
20 along with the liquid supply by said liquid supply portion; and

- a liquid agitating structure provided inside said liquid chamber and adapted to agitate the liquid in said liquid chamber, utilizing liquid flow generated  
25 in said liquid chamber by the air introduction from said air introducing portion into said liquid chamber.

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21. A liquid container according to claim 20,  
wherein said liquid agitating structure is composed  
of at least a rib provided protruding from the  
internal wall of said liquid chamber in a position  
5 collided directly or indirectly by a liquid flow  
generated in said liquid chamber.

22. A liquid container according to claim 21,  
wherein said rib is positioned higher than said air  
10 introducing portion.

23. A liquid container according to claim 21,  
wherein said rib is provided between said liquid  
supply portion and said air introducing portion.  
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24. A liquid container according to claim 21,  
wherein said rib is provided on mutually opposed  
positions of mutually opposed two internal wall faces  
of said liquid chamber.  
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25. A liquid container according to claim 21,  
wherein said rib is a pillar-shaped member connecting  
the mutually opposed two internal wall faces of said  
liquid chamber.  
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26. A liquid container according to claim 25,  
wherein said pillar-shaped member is provided in a

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position collided by a rising liquid flow generated in said liquid chamber.

27. A liquid container according to claim 21,  
5 wherein said pillar-shaped member is provided higher than said air introducing portion and between said liquid supply portion and said air introducing portion.

10 28. A liquid container according to claim 27, wherein said pillar-shaped member is provided in plural units with a gap therebetween in the vertical direction of said liquid chamber.

15 29. A liquid container according to claim 20, wherein said liquid supply portion is provided at a corner portion of said liquid chamber.

20 30. A liquid container according to claim 20, wherein said liquid supply portion and said air introducing portion are provided in mutually adjacent manner.

25 31. A liquid supply system comprising:  
a liquid container according to any of claims 1 to 6, 8 to 11;

liquid supply means connected with said liquid

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supply portion of said liquid container for supplying the liquid in said liquid chamber to the exterior of said liquid chamber; and

air introducing means connected with said air  
5 introducing portion of said liquid container thereby causing the interior of said liquid chamber to communicate with the air.

10 32. A liquid supply system according to claim 31, further comprising suction means for forcedly sucking the liquid in said liquid chamber through said liquid supply means.

15 33. A liquid supply system according to claim 31, wherein said liquid chamber is closed by sealing said liquid supply portion and said air introducing portion respectively with seal members; and

said liquid supply means and said air introducing means respectively include needle-shaped members for  
20 penetrating said seal members.

34. A liquid container comprising:  
a liquid chamber directly containing liquid;  
a liquid supply portion provided in the bottom  
25 portion of said liquid chamber for supplying the liquid in said liquid chamber to the exterior;  
an air introducing portion provided in the bottom

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portion of said liquid chamber and adapted to  
introduce air into said liquid chamber so as to  
maintain a constant pressure in said liquid chamber  
along with the liquid supply by said liquid supply  
5 portion; and

at least a rib provided protruding from the  
internal wall face of said liquid chamber;

wherein said liquid supply portion and said air  
introducing portion are provided mutually close and  
10 in a deviated manner close to an end of the liquid  
chamber.

35. A liquid container according to claim 34,  
wherein said rib is positioned higher than said air  
15 introducing portion.

36. A liquid container according to claim 34,  
wherein said rib is provided between said liquid  
supply portion and said air introducing portion.

20 37. A liquid container according to claim 34,  
wherein said rib is provided on mutually opposed  
positions of mutually opposed two internal wall faces  
of said liquid chamber.

25 38. A liquid container according to claim 34,  
wherein said rib is a pillar-shaped member connecting

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the mutually opposed two internal wall faces of said liquid chamber.

39. A liquid container according to claim 38,  
5 wherein said pillar-shaped member is provided in a position collided by a rising liquid flow generated in said liquid chamber.

40. A liquid container according to claim 38,  
10 wherein said pillar-shaped member is provided higher than said air introducing portion and between said liquid supply portion and said air introducing portion.

41. A liquid container according to claim 40,  
15 wherein said pillar-shaped member is provided in plural units with a gap therebetween in the vertical direction of said liquid chamber.

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20 42. An ink jet recording apparatus for discharging liquid ink for recording on a recording medium, comprising:

holding means for detachably holding a recording head for executing recording by discharging ink;

25 a liquid container according to any of claims 1 to 6, 8 to 14, 17, 20 to 23 for containing ink to be supplied to said recording head;

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5 a liquid supply unit for connecting said  
recording head and said liquid supply portion of said  
liquid container thereby supplying ink in said liquid  
chamber to said recording head along with the ink  
discharge from said recording head and communicating  
the interior of said liquid chamber with the air  
through said air introducing portion of said liquid  
container; and

10 suction means for forcedly sucking the ink in  
said recording head.

43. A liquid agitating method for agitating the  
liquid in a liquid container including a liquid  
chamber containing liquid; a liquid supply portion  
15 provided in the bottom portion of said liquid chamber  
for supplying the liquid in said liquid chamber to  
the exterior; an air introducing portion provided in  
the bottom portion of said liquid chamber and adapted  
to introduce air into said liquid chamber; and a rib  
20 provided on the internal wall of said liquid chamber,  
the method comprising:

a step of supplying the liquid in said liquid  
chamber from said liquid supply portion to the  
exterior; and

25 a step of introducing air from said air  
introducing portion into said liquid chamber so as to  
maintain constant the pressure in said liquid chamber,

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decreasing by the liquid supply from said liquid supply portion to the exterior, and generating a flow in the liquid in said liquid chamber directed directly or indirectly toward said rib.

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44. A liquid agitating method according to claim 43, wherein said step of supplying liquid from said liquid supply portion to the exterior includes a step of forcedly sucking the liquid in said liquid chamber.

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